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ABSTRACT

These guidelines are for individuals and school divisions contemplating or already integrating academic and vocational education. Section 1 discusses two goals for integration. Section 2 provides a justification for integration and discusses the contradiction in the skills obtained in school and those needed in the workplace. Section 3 defines the integration of academic and vocational education in practical terms. Three aspects of integration are explored; they are integration: as defined by the 1990 Perkins Act; based on the eight models defined by Grubb et al. (1991); and as related to tech prep. Section 4 identifies barriers to integration and lists suggestions for eliminating them. Section 5 discusses ways to encourage cooperative efforts between academic and vocational teachers. Section 6 focuses on roles of key players: academic and vocational teachers, secondary school principals, secondary school counselors, and secondary school administrators and supervisory personnel. Section 7 discusses three aspects of the process for implementing integration: planning stages, marketing strategy, and strategies for policy change. Section 8 lists effective curricular and instructional strategies. References are listed at the end of each section. Section 9 contains a consolidated list of 20 references. Appendixes include 13 related references and transparency masters for use during staff inservice training and informational meetings with school administrators. (YLB)

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National Center for Research in
Vocational Education

University of California, Berkeley

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EXECUTIVE SUMMARY

The guidelines presented in this book were prepared with input from seventeen secondary school principals and administrators from across the United States. The document is written for individuals and school divisions that are contemplating or are in the process of integrating academic and vocational education. The guidelines are designed so that a school administrator who has a particular question or area of interest can proceed directly to a particular section for the answer. The guidelines begin with a brief discussion of two goals for integrating academic and vocational education: (1) to provide students with the appropriate skills to function in a global society and (2) to enhance students' learning. Following the goals, a justification for integrating academic and vocational education as well as a comparison of the skills emphasized in school versus the skills needed in the workplace are presented. The justification begins with a series of reports that emerged in the early 1980s, espousing educational reform and a movement to restructure the schools.

Next, the guidelines define the integration of academic and vocational education in practical terms. First, the integration as spelled out in the Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 is examined. Second, integration is interpreted based on the eight models defined through research efforts of the National Center for Research in Vocational Education (NCRVE). Finally, integration as related to the emerging concept of Tech Prep is examined.

Possible barriers to integrating academic and vocational education—including administrative, school, and teacher barriers—are identified with suggestions for eliminating them listed after each specific barrier. Following the section on barriers, the guidelines provide ways to encourage cooperative efforts between academic and vocational teachers.

The next section focuses on the roles of the keys players in the integration process. The key players are academic and vocational teachers, secondary school principals, secondary school counselors, and secondary school administrators and supervisory personnel. During the integration process, teachers take on the roles of leader, team member, learner, and instructor. Secondary school principals take on the roles of

supporter, communicator, motivator, delegator, and manager. Secondary school counselors assume the roles of team member, evaluator, and leader; and secondary school administrators and supervisory personnel assume the roles of supporter, communicator, motivator, delegator, and manager.

Three aspects of the process for achieving the integration of academic and vocational education are presented. They are the planning stages, the marketing strategy, and strategies for policy changes. Then, there is a section based on NCRVE research of teachers' roles in the integration process. Specifically, effective curricular and instructional strategies that have been used by teachers in school divisions that have successfully integrated academic and vocational education are listed.

Finally, there is a consolidated list of references used throughout the report as well as suggested transparency masters for use during faculty and staff inservice sessions and during informational sessions with school administrators.

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What Are Some of the Goals for Integrating Academic and Vocational Education?

This section discusses two goals for integrating academic and vocational education. Goal 1 is to provide students with the appropriate skills to function in a global society. Goal 2 is to enhance students' learning.

In examining the literature, two predominant goals for integrating academic and vocational education emerge. The first goal is to provide all students with the occupational, academic, and higher-order thinking skills needed to function effectively in a technologically advanced society, a globally competitive marketplace, and an information-based economy.

The second goal for integrating academic and vocational education is to enhance students' learning using the findings of cognitive psychologists. Within this context, the focus is placed on the students rather than on the content. Basic academic skills and problem-solving skills are taught simultaneously so that they are mutually reinforcing. Students are encouraged to recognize and solve problems, and the academic skills are reinforced with hands-on applications. Figure 1 illustrates these two goals graphically.

GOAL 1

To provide all students with the occupational, academic, and higher-order thinking skills needed to function effectively in

- A technologically advanced society
- A globally competitive marketplace
- An information-based economy

GOAL 2

To enhance students' learning using the findings of cognitive psychologists . . .

- The focus is on students, not on content
- Basic academic skills and problem-solving skills are taught at the same time so that they are mutually reinforcing
- Students are encouraged to recognize and solve problems
- Academic skills are reinforced with hands-on applications

Figure 1

What Is the Need for Integrating Academic and Vocational Education?

This section provides a justification for integrating academic and vocational education as well as a discussion of the contradiction in the skills obtained in school and the skills needed in the workplace.

In recent years, educators have looked at the possibility of integrating academic and vocational education to improve the quality of education being provided to students. These changes are based on two questions: (1) Why change the current instructional delivery system? and (2) What skills do the students need? The discussion that follows briefly addresses these questions.

Justification

In the early 1980s, a series of reports emerged that espoused educational reform and a movement to restructure the schools. One of the first reports calling for a "back-to-basics" movement was *A Nation at Risk* (National Commission on Excellence in Education [NCEE], 1983). Its authors state that "knowledge, learning, information, and skilled intelligence are the new raw materials of international commerce . . ." (p. 7). The authors further note that many high school graduates are not prepared to enter the world of work or to further their education at a postsecondary institution. Thus, *A Nation at Risk* calls for educational reform that would "focus on the goal of creating a Learning Society" (p. 13) by decreasing the cafeteria-style curriculum and increasing time spent learning English, mathematics, science, social studies, and computer science. Many states responded to *A Nation at Risk* by increasing the number of academic courses required for high school graduation (National Commission on Secondary Vocational Education [NCSVE], 1984).

Conversely, the authors of *The Unfinished Agenda* (NCSVE, 1984) state that increased academic requirements ignore the "differences in student interests and abilities, and . . . the needs of those high school students who do not plan to go to college and who purposefully choose a vocational program" (p. 1). The authors further stated that this "narrow focus ignores the fact that approximately 80% of the jobs in America do not require a college degree, and most students will not obtain one" (p. 1). Commission members believed that education should prepare *all* young people for their adult lives; further, they suggested that this task could be accomplished through a "joint effort of vocational and academic educators to 'bridge the gap' between theoretical and practical education" (Adelman, 1989, p. I-2).

Almost a decade later, educational reports are still being published calling for educational reform. In *America 2000: An Education Strategy* (U.S. Department of Education, 1991), President Bush states that "we must transform America's schools. The days of status quo are over" (p. 2). Further, *What Work Requires of Schools: A SCANS Report for America 2000* (Secretary's Commission on Achieving Necessary Skills [SCANS], 1991) calls for a transformation of "the nation's schools into high-performance organizations . . . [that will produce] skilled graduates as the norm, not the exception" (p. vi). The SCANS report emphasizes that our nation cannot be competitive in a global economy unless schools produce graduates who have both foundation skills and workplace competencies. Thus, a need exists for educational reform that will maximize our most valuable resource—human capital. The integration of academic and vocational education focuses on meeting this need.

Additionally, American business and industry leaders have called upon schools to upgrade the quality of education provided at the secondary level. Many business publications and research documents conclude that America is losing its competitive edge, with this decline attributed to a workforce that is unprepared for a technologically advanced workplace (Howell, 1989). An inconsistency appears to exist between skills needed in the workplace and the types of skills taught in secondary schools. Students today need technical preparation for a technical world; in schools, however, instruction still emphasizes learning for personal use. Substantiating these comments, Bennett and McLaughlin (1988) report that schools are teaching students reading, writing, and mathematical skills that are inconsistent with what workers routinely perform on the job. Resnick (1987) agrees, stating that "growing evidence . . . points to the possibility that very little can be transported directly from school to out-of-school use" (p. 15). Thus, today's teachers cannot rely on traditional classroom delivery techniques. Rather, they must adapt material to make it relevant to the world of work as well as present it in ways that enhance transfer of learning.

The Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 address the importance of integrating academic and vocational education in order to make the United States a more competitive nation. Section 2 of the act states,

> It is the purpose of this Act to make the United States more competitive in the world economy by developing more fully the academic and occupational skills of all segments of the population. This purpose will principally be achieved through concentrating resources on improving educational programs leading to academic and occupational skill competencies needed to work in a technologically advanced society.

The act affirms this mission by requiring recipients of funds to include in their applications to the state board of education a plan to integrate academic and vocational education and to offer the classes in a logical progression. Section 240(11)(a) and (11)(b) explicitly state that local recipients desiring federal funding under Title II, Subpart 3 shall "provide a description of how . . . [they] will provide a vocational education program that (a) integrates academic and occupational disciplines so that students participating in the program are able to achieve both academic and occupational competence; and (b) offers coherent sequences of courses leading to a job skill." Finally, Section 403 specifies that the Office of Education Research and Improvement will assess and evaluate "the extent and success of integration of academic and vocational curricula."

Benson's (1989) arguments supporting the integration of academic and vocational education in his testimony before the Senate Subcommittee on Education, Arts, and Humanities noted that "the case for integration stands on three main . . . arguments: economic necessity, findings from the field of cognitive science, and social justice with respect to the distribution of academic and vocational learnings" (p. 3). On the demand side of economic necessity, Benson cites increases in international trade, the rise of the service sector, the rapid change of technological advances in the workplace, as well as the consumer's search for quality and variety. Conversely, on the supply side of the economic necessity, new entrants in the workforce are declining. Benson continues, "In 1975, two million Americans entered the workforce. In 1988, hardly more than 700,000 persons entered the workforce for the first time" (p. 5). Johnston and Packer (1987) in *Workforce 2000* note that by the year 2000, the workforce will be increasing by only one percent per year, a "slower rate than at any time since the 1930s" (p. 78). Along with the decrease in the number of new entrants into the workforce, the educational levels of those entering have fallen. Benson (1989) reports that "only 25% of new entrants will be academically and vocationally qualified for three quarters of [the] new jobs" (p. 6). This disparity in the demand and supply sides of economic necessity sets the stage for educational reform.

Benson (1989) also cited the findings of cognitive scientists to support the integration of academic and vocational education. Cognitive scientists have studied the processes of how people acquire academic and occupational skills. They have concluded that students are better able to transfer problem-solving skills to the workplace when theory is taught in a practical context. Brown and Campione (1984) believe that students require exposure to the conceptual tools needed in problem solving as well as the opportunity to observe practitioners using these tools to solve real-life problems. Their belief, however, does not mean that abstractions should not be taught to students. Rather, students will "better understand when . . . meaning is explored in detail within specific situations in which they apply" (Raizen, 1989, p. 27).

Finally, Benson (1989) cites social justice in the distribution of academic and vocational learning to all students to support the need for integrating academic and vocational education. Generally, schools have three tracks: (1) college-bound, (2) general, and (3) vocational. The college-bound track is typically for students who have attained a high level of academic achievement. In addition, some vocational programs that prepare students for advanced technological occupations exclude students on the basis of prior academic proficiency. On the other hand, general-track and lower-level vocational courses that often do not fit into any sequential program of study are open to all students. Some of these students enroll in these classes randomly with the outcome being that general-track graduates often leave the formal education setting unprepared for college or for a vocation. Johnston and Packer (1987) maintain that job opportunities will be scarce for these unskilled workers.

Further, students enrolled in the college-preparatory track often have little or no exposure to academic subjects in applied settings or to advanced technological processes (Benson, 1989). Yet, a majority of these students will eventually enter the workforce in some vocation that requires advanced technological skills. Schools should, therefore, ensure that all students are exposed to academic subjects in juxtaposition with advanced technological processes.

Contradiction in Skills Obtained and Skills Needed

As stated above, there is a discrepancy between the skills that are needed in the workplace and the skills that are taught in schools. Resnick (1987) specifically cites four contradictions between what students are taught in school and the skills needed in "daily life and work" (p. 13). First, learning and evaluation in the school setting generally focus on individual activities; conversely, most out-of-school activity is shared socially, and success is determined by group effort. Second, schools value activities that take place without the aid of tools (e.g., calculators, books, and notes); employers, on the other hand, encourage (and for some tasks, require) their employees to use tools. In many cases, tools help employees perform their jobs more efficiently. Next, most learning that takes place in school is symbol-based and has very little connection to real objects, events, or problems. Research, however, indicates that people in real-world settings routinely solve concrete problems they may not be able to solve with pencil and paper. Finally, schools see it as their mission "to teach general, widely usable skills and theoretical principles." Accumulating evidence suggests, however, that very little of what is learned in school is transferrable to "real-life" situations.

If educators are to effectively and efficiently prepare students, they must comprehend the needs of the labor market. The job market today and in the next century demands employees who have improved math, communication, and reasoning skills (Johnston & Packer, 1987) as well as "employees who can think, solve problems, troubleshoot, and communicate by situation rather than by formula" (Adelman, 1989, p. II-21). This demand suggests that the "basic skills" espoused by *A Nation at Risk* are much more than "reading, writing, and 'rithmetic." Rather, "basic skills" should be termed "academic skills" and the definition expanded to also include thinking, problem solving, and comprehension.

Carnevale, Gainer, and Meltzer (1988) also assert that the skills taught by schools are contradictory to the skills employers need. Many times, employees know how to read and how to compute; however, when called upon to use these skills, they often have difficulty "because [the] skills must be used in a different context than originally learned" (p. 10). For example, school reading focuses on use of reading for leisure. Further, "traditional classroom . . . reading instruction is designed to teach discrete reading skills in isolation for the purpose of increasing a student's ability to follow directions or

internalize data for future recall." Conversely, reading on the job is often technical in nature and "require[s] the reader to be analytical, to summarize information, and to monitor one's comprehension of the reading task. A recent article in *U.S. News & World Report* entitled "The Forgotten Half" (1989) reported that a car mechanic in 1965 needed to understand five thousand pages of service manuals to repair any automobile on the road. That same mechanic today must be able to comprehend 465,000 pages of technical manuals to successfully repair any automobile on the road. In addition, the "Career Preparation Validation Study" (Anderson Committee, 1991) reported that a majority of entry-level workers in the State of New York need "reading for information" skills and "reading for critical analysis and evaluation" skills. Thus, from the employers' perspective, reading instruction at the secondary level should focus on teaching students to use reading material as a resource to locate information as well as for problem solving using higher-level thinking strategies (Carnevale et al., 1988). This instruction can be accomplished by academic and vocational education teachers collaborating to integrate their subject materials to make them relevant to occupational requirements.

Further, Carnevale et al. (1988) note an inconsistency that exists in the writing and computation skills taught at the secondary level with those skills needed on the job. Traditional classroom instruction in writing generally focuses on creative writing and the articulation of memorized responses of facts and events. Writing on the job requires "analysis, conceptualization, synthesis, distillation of information, and clear, succinct articulation of points and proposals." The Anderson Committee (1991) reported that over two-thirds of all entry-level workers need to be able to write for critical analyses and evaluations, and approximately one-fourth of all entry-level workers need to be able to write information clearly so that others can understand it. Writing on the job generally does not consist of creative essays; rather, writing involves business letters, proposals, and technical reports (Corvallis School District, 1982).

Similarly, traditional mathematical instruction at the secondary level consists of a sequential presentation, beginning with addition and subtraction and then progressing to algebra, geometry, and trigonometry. After the students and their instructors work sample problems together, students practice the mathematical concepts independently. Conversely, computational skills on the job deal with specific work-related problems which require problem identification, estimation, and problem solving with employees

working cooperatively (Carnevale et al., 1988). The Anderson Committee (1991) found that entry-level workers need skills in basic operations, logic and probability, measurement, and some statistics, with algebra and geometry having minimal significance for a majority of entry-level workers.

Carnevale et al. (1988) list additional skills secondary schools need to emphasize. First, employers want employees who know how to learn. Based on their interactions with employers, the authors contend that knowing how to learn is basic to success on the job and that an individual who is equipped with this skill can become competent in all of the other basic workplace skills. Secondly, employers want employees who can communicate effectively. Employees need to be able to understand what customers and associates say and then convey an appropriate response. Next, in order to meet strategic objectives in a competitive climate, businesses need innovative employees who have problem-solving skills. Finally, businesses need motivated employees who can manage their own workloads and at the same time work as members of a team. As members of a team, employees may need to assume leadership roles and help motivate other members of a work group. The need for these higher-order skills is echoed by Adelman (1989) who states that the skills required for jobs today include the ability to read technical material, to think, to use problem-solving skills, and to communicate effectively. The Anderson Committee (1991) also substantiates that workers need "extended basics" or the higher-order skills of interpersonal relations, reasoning and problem solving, working as members of teams, and applying what they have learned.

Summary

It is clear that the workplace is changing at a rapid pace and that employers are demanding that the workers they hire have a much broader range of skills than in the past. Employers are looking not only for people who have technical qualifications but who have also demonstrated their ability to be team members, to use analysis and problem-solving strategies, and to communicate effectively with a variety of people in a workplace setting. At the same time, educational practitioners must recognize that employers' needs are not the sole purpose of public education content. Research indicates that a majority of people learn best in practical contexts. Additionally, educators must

realize that not all students are going on to complete university degrees, and educators must consider the consequences of not preparing people for the skills of the future.

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What Is the Integration of Academic and Vocational Education?

This section defines the integration of academic and vocational education in practical terms. First, integration as defined by the Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 is examined. Second, integration is interpreted based on the eight models defined by Grubb, Davis, Lum, Plihal, and Morgaine (1991). Finally, integration as related to another emerging concept called Tech Prep is examined.

Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990

This section provides the federal-level definition of integrating academic and vocational education. The Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 represent the first time that federal legislation has ever discussed this concept. The Perkins Act of 1990 mandates that schools seeking funds from Title II demonstrate a plan for integrating academic and vocational skills and then assess the outcomes.

The numbered statements are direct quotations from the Perkins Act of 1990. The italicized bold-faced type directly below each numbered item is a paraphrase of the quotation.

Section 2 (Statement of Purpose): It is the purpose of this Act to make the United States more competitive in the world economy by developing more fully the academic and occupational skills of all segments of the population. This purpose will principally be achieved through concentrating resources on improving educational programs leading to academic and occupational skill competencies needed to work in a technologically advanced society.

> ***The purpose of the act is to provide a technically skilled workforce to help the United States become more competitive in a global economy. This goal will be achieved by integrating academic and vocational education.***

Section 113 (State Plan) (a)(3)(B): In general any State desiring to receive funds from its allotment for any fiscal year shall submit to the Secretary a State plan for a 3-year period, in the case of the initial plan, and a 2-year period thereafter, together with such annual revisions as the State board determines to be necessary. . . . In developing the State plan, the State shall conduct an assessment. . . . Such assessment shall include analysis of . . . the capability of vocational education programs to provide vocational education students, to the extent practicable, with (i) strong experience in and understanding of all aspects of the industry the students are preparing to enter (including planning, management, finances, technical and production skills, underlying principles of

technology, labor and community issues, and health, safety, and environmental issues); and (ii) strong development and use of problem-solving skills and basic and advanced academic skills (including skills in the areas of mathematics, reading, writing, science, and social studies) in a technological setting.

> ***All states that desire funds from the Perkins Act must submit a three-year state plan to the Secretary of Education. The state plan must include a statement on how the students enrolled in vocational education programs will understand all aspects of local business and industry. Additionally, the state plan must include a statement of how the vocational programs will develop students' problem-solving skills and incorporate academic skills into applied settings.***

Section 115 (State and Local Standards and Measures) (b)(1): Each system developed . . . shall include measures of learning and competency gains, including student progress in the achievement of basic and more advanced academic skills.

> ***States and local districts must determine the performance standards for measuring students' competency gains in basic and advanced academic skills.***

Section 115 (State and Local Standards and Measures) (c)(1): In developing the standards and measures included in a system developed . . . , the State board shall take into consideration standards and measures developed under job opportunities and basic skills training programs established and operated under a plan approved by the Secretary of Health and Human Services. . . .

> ***When developing the performance standards above, the states and local districts should coordinate their plan with other standards and measures developed under job opportunities and basic skills training programs through the Health and Human Services Department.***

Title II, Part A, Section 201 (State Programs and State Leadership) (b)(1): The programs and activities described in subsection (a) shall include professional development activities for vocational teachers and academic teachers working with vocational education

students, including corrections educators and counselors, and educators and counselors in community-based organizations, including inservice and preservice training of teachers in state-of-the-art programs and techniques, including integration of vocational and academic curricula, with particular emphasis on inservice and preservice training of minority teachers.

> ***States receiving funds from Title II must conduct state programs and state activities, including professional development for academic and vocational teachers implementing the integration of academic and vocational education.***

Title II, Part C, Subpart 3, Section 240 (Local Application) (11): Any eligible recipient desiring financial assistance under this part shall, according to requirements established by the State board, submit to the State board an application, covering the same period as the State plan, for the use of such assistance. The State board shall determine requirements for local applications, except that each such application shall provide a description of how the eligible recipient will provide a vocational education program that (A) integrates academic and occupational disciplines so that students participating in the program are able to achieve both academic and occupational competence; and (B) offers coherent sequences of courses leading to a job skill.

> ***States requesting funds from Title II must submit an application for the same period as the state plan (three years). This application will include a statement describing how the vocational education programs will integrate academic and vocational disciplines as well as provide logical sequences of courses that will prepare students in an occupational cluster.***

Title IV, Part A, Section 402 (National Assessment of Vocational Education Programs) (a)(6): In order to carry out the objectives set forth in section 401, the Secretary shall conduct applied research on aspects of vocational education specifically related to this Act. Such research may be conducted through the Office of Educational Research and Improvement. Such research shall include successful methods of reinforcing and enhancing basic and more advanced academic and problem-solving skills in vocational settings.

The Secretary of Education will be responsible for conducting research on integrating basic and advanced academic and problem-solving skills into vocational education.

Models for Integrating Academic and Vocational Education

The integration of academic and vocational education has also been defined through research conducted over the past several years. The National Center for Research in Vocational Education has identified eight integration models which represent various ways that integrating academic and vocational education has occurred and been delivered at the local level.

Through research and site observations, Grubb, Davis, Lum, Plihal, and Morgaine (1991) identified eight models for integrating academic and vocational education. These models include varying degrees of integration, which Grubb et al. describe using a five-step ladder analogy. On the first level of the ladder is "basic infusion"; Model I is on this step. Basic infusion is simply incorporating academic content into vocational courses. "Advanced infusion," Model II, is the second step of the ladder. At this level of integrating academic and vocational education, the vocational curriculum is modified through the efforts of the academic departments. The third step of the ladder is "applied academics"; Model III is on this step. On this step of the integration ladder, the curriculum of academic courses is modified to incorporate vocational skills and competencies. A common approach is to implement applied academic classes. The fourth step of the integration ladder is "curriculum alignment," Model IV. On this step, both academic and vocational curricula are modified and rely heavily on teacher collaboration. The fifth step of the ladder, "restructured schools," encompasses Models V, VI, VII, and VIII. As the name implies, all of the models on this step require that the schools' structure be modified as a requisite to integrating academic and vocational education. A detailed description of each model as defined by Grubb et al. follows.

Model I*

Incorporating Academic Content into Vocational Courses

- Vocational teachers are responsible for integrating academic skills into vocational courses.
- Collaboration between teachers is not a requirement.
- Integrated academic skills generally are remedial.
- This approach has not proven effective.

Model I is probably the simplest form of integrating academic and vocational education. The procedure for integration in Model I can be either informal or formal; it can be as informal as teachers simply requiring more writing exercises in their vocational classes or as formal as developing model curricula within an individual school district or within a consortium of school districts or curriculum development sponsored by states. Characteristics of Model I include the following:

- Integration of academic and vocational education occurs within vocational classes.
- The curricula for general and academic classes are left intact; the curricula for vocational education are modified to incorporate academic competencies.
- Integration can occur within existing vocational courses with little disruption or expense.
- The career guidance and counseling function of the high school generally is not modified.
- Integration occurs with no collaboration between academic and vocational teachers.

* Adapted from Grubb et al. (1991).

- The level of academic competencies identified for integration is frequently low and remedial in nature.
- The integration process can be initiated informally by vocational teachers or principals.
- The integration process can be initiated formally through the development of model curricula; this development can originate at various levels:
  - Within an individual school district
  - Within a consortium of school districts
  - Within a state

Model II*
Linking Academic and Vocational Teachers To Enhance Academic Competencies in Vocational Courses

- Academic skills are integrated into vocational classes.
- Academic teachers are assigned to work with vocational teachers.
- Academic teachers have the prime responsibility for integrating academic skills into vocational classes.
- Academic and vocational teachers work cooperatively to modify vocational programs.

Model II integrates academic and vocational education within vocational curricula and leaves the academic curricula untouched. The responsibility for initiating integration lies with academic teachers. However, because certain academic teachers are assigned to work with vocational teachers, collaboration between academic and vocational teachers exists. In practice to date, the level of instruction provided within Model II tends to be low and remedial in nature; however, integration within this model does not have to be remedial. Characteristics of Model II include the following:

- Integration of academic and vocational education occurs within vocational classes.
- Integration is the prime responsibility of academic teachers.
- There is collaboration between academic and vocational teachers.
- The curricula for general and academic classes are left intact; the curricula for vocational education are modified to incorporate academic competencies.
- Academic teachers work with vocational programs in several capacities:

* Adapted from Grubb et al. (1991).

- They may teach individual lessons or modules in vocational courses.
- They may help vocational teachers develop academic exercises.
- They may work with individual vocational students who are having difficulties with a particular academic subject.
- They may teach an applied academic subject (i.e., English, mathematics, or science) within the vocational instructional setting; because the course is taught by an academic teacher, a student may receive credit toward graduation.

- Team teaching may occur; thus, the instructional cost per student may increase.
- The instruction may be remedial in nature but not necessarily so.

Model III*

Making the Academic Curriculum Vocationally Relevant

- Vocational skills and concepts are integrated into academic classes.
- Academic teachers are responsible for integrating vocational concepts into their classes.
- Collaboration between academic and vocational teachers is not a requisite.
- Applied academic courses are common vehicles for integrating academic and vocational education.

Model III integrates academic and vocational education within the academic curricula and leaves vocational programs intact. As in the first model, the procedure for integration can range from informal to formal. The informal approach generally involves pressure from the principal to incorporate vocational applications and implications whenever possible in academic courses. A more formal approach is to introduce applied academic courses. Most instructional materials used in these courses, however, are "off the shelf"; thus, little incentive exists for teachers to collaborate in developing an integrated curriculum. Characteristics of Model III include the following:

- Integration of academic and vocational education occurs within academic classes.
- The curricula for vocational education are left intact; the curricula for academic education is modified to incorporate vocational applications and implications.
- Integration is the prime responsibility of academic teachers.
- This model does not promote collaboration between academic and vocational teachers.

* Adapted from Grubb et al. (1991).

- The integration process can be initiated informally through encouragement from principals for academic teachers to incorporate vocational applications and implications.

- The integration process can be initiated formally through the introduction of applied academic courses; the three most widely used applied academic courses are principles of technology, applied mathematics, and applied communications. They can be used

  - for remedial purposes by either vocational or general track students;

  - to complement vocational classes, providing a logical sequence of academic and vocational courses with the course content modified to the individual needs of the schools;

  - as electives taken primarily by general education and vocational students in place of general courses (e.g., general science and general math); and

  - as credit toward graduation in English, mathematics, and science if taught by teachers certified in these areas.

Model IV*

Curricular Alignment, Modifying Both Academic and Vocational Courses

- Integration is considered at the program level rather than at the individual course level.
- Both academic and vocational classes are modified and coordinated to integrate academic and vocational skills.
- Collaboration among teachers is a requisite.
- Academic and vocational classes can be offered laterally or sequentially so that they reinforce each other.
- Curricula are developed locally.

Model IV conceives of integration at the high school program level rather than at the individual course level. In this model, the content of both academic and vocational courses is changed in order to integrate academic and vocational education. The curriculum alignment can be simple and informal in nature or can become quite complex. It can be as informal as academic and vocational teachers working together to coordinate one or two lessons or it can be as complex as entire courses being linked together with academic and vocational teachers each being responsible for teaching and evaluating specific objectives. Characteristics of Model IV include the following:

- Integration occurs at the high school program level rather than at the individual course level.
- Both academic and vocational courses are modified and linked together in order to integrate academic and vocational education.
    - Academic courses incorporate more occupationally relevant material.
    - Vocational courses incorporate more academic or basic instruction.

* Adapted from Grubb et al. (1991).

- The content of academic and vocational classes is coordinated.
    - Horizontal alignment occurs when students learn about similar subjects at the same time in both their academic and vocational classes.
    - Vertical alignment occurs when students take academic and vocational courses sequentially (i.e., one after the other).
- Academic and vocational teachers currently employed by the school district collaborate to modify courses, eliminating the need to hire additional personnel.
- Academic and vocational courses already in place in the curriculum are modified to integrate academic and vocational education; new courses need not be added to the curriculum.
- Academic and vocational teachers must work together to ensure that course content is consistent and mutually reinforcing.
- Because of the uniqueness of each locality and of individual teachers within that locality, it is essential that curricula be developed locally; thus, purchasing "off the shelf" materials is almost impossible.

Model V*

The Senior Project as a Form of Integration

- Course content in all secondary classes centers around the senior project.
- Integration that occurs is unintentional.
- Collaboration between academic and vocational teachers is not requisite.

An alternative (or a supplement) to a formal restructuring of courses or programs to integrate academic and vocational education is the senior project. In this model, the curriculum is structured around the senior project rather than around courses and course sequences. The goals of the senior project are usually to develop skills in independent work, problem solving, and presenting results and findings to others.

- Student preparation for the project usually begins in the ninth or tenth grade with research techniques, experimentation, and problem solving, for example.
- Course content may be modified to incorporate the skills necessary (i.e., problem-solving skills; communication skills, both written and oral; and technical skills) so the students can work on the senior project independently.
- Academic and vocational integration is usually unintentional; however, the senior project model may be an impetus for getting academic and vocational teachers to work together.
- Curriculum centers around the senior project.
- The project can be either vocational or academic in nature.

* Adapted from Grubb et al. (1991).

Model VI*
The Academy Model

- An academy operates as a school-within-a-school.
- The curriculum centers around a vocational program.
- Students take classes from the same teachers for the duration of their program.
- Horizontal and vertical alignment is promoted.
- Special needs students who have the potential to drop out may benefit from this type of integration.

Academies typically operate as a school-within-a-school. Generally, an academy operates with four teachers working together in a collaborative effort to form a curriculum around a vocational subject (e.g., electronics, business, automotive, or health). Because the teachers work with the students and the other teachers within the academy for a period of years, this structure facilitates the integration of academic and vocational education.

- An academy operates as a school-within-a-school, centered around one occupational cluster.
- Typically, an academy is made up of four teachers: a math teacher, an English teacher, a science teacher, and a vocational teacher.
- Students take classes from the same teachers for two or three years.
- Academies develop close relationships with firms that operate in the occupational area of the academy (e.g., a health academy could form alliances with local hospitals), thus providing a realistic context for instruction.
    - The firms can provide mentors for the students.

* Adapted from Grubb et al. (1991).

- The firms can provide summer internships for the students.
- The firms can provide tours of facilities.

- There is generally a high teacher-student ratio, thus a higher cost per student.
- Because the teachers can coordinate the topics they teach, the structure provides for horizontal curriculum alignment.
- Because the teachers spend a period of years with the same students, over time they can adjust the sequence of courses according to the students' needs, thus providing for vertical curriculum alignment.
- Many academies select students who appear to be performing below their capability and may be potential dropouts; thus, students enrolled in an academy tend to be segregated from the general high school population.

Model VII*
Occupational High Schools and Magnet Schools

- High schools or magnet schools focus on a single occupational area.
- An occupational area is the basis for the curriculum content.
- The school's mission is to prepare students for future entry into a particular occupational area.

An occupational high school centers its curriculum around an occupational cluster (e.g., aviation, fashion industries, business, or agriculture sciences). In occupational high schools, the teachers are aware of the school's goals and can incorporate material related to the occupational focus of the school into their classes. Many magnet schools also have an occupational focus (e.g., computers, electronics, or business), and all students are enrolled in a similar curriculum that incorporates courses related to the magnet's focus. Thus, all teachers can integrate information related to that occupational area into their courses.

- A high school emphasizes clusters of related vocations within a single broad occupational area.
- The school's curriculum content is dominated by the focus of the occupational area.
- Occupational high schools and magnet schools have clear missions: to educate students so they are prepared in a particular occupational area either to go directly into the world of work or to pursue further education in the field at a postsecondary institution.

* Adapted from Grubb et al. (1991).

Model VIII*

Occupational Clusters, Career Paths, and Occupational Majors

- The curriculum is organized into
  - occupational clusters or
  - occupational clusters cut across conventional academic and vocational departments.
- Integration occurs at both the program and course levels.
- Collaboration between academic and vocational teachers is a requisite.
- Close alliances with the business community are important.
- Students formulate individual programs of study.

In practice, this model has taken two main paths. First, some high schools have replaced conventional academic and vocational departments with departments organized around occupational clusters (e.g., agriculture, business, trade and industry, public service, or health science). With this approach, teachers are assigned to the occupational department or cluster. A second approach, a matrix approach, uses occupational clusters (e.g., agriculture and natural resources; business and marketing; art and communication; health, home, and recreation; industrial technologies and engineering; or social, human, and governmental services) that cut across conventional departments.

- The high school curricula are based on occupational clusters. Conventional academic and vocational departments are replaced by departments organized around occupational clusters, or a matrix approach where occupational clusters cut across conventional departments is used.

* Adapted from Grubb et al. (1991).

- Because the curricula evolve around occupational areas, there are inherent occasions for forming alliances with local business and industry.

- This model facilities integration at the program level as well as with individual courses.

- Each occupational department or cluster has a theme, and the courses suggested for the programs of study have a logical sequence that provides focus and cohesion for the students.

- Teachers meet on a regular basis to discuss possible activities, courses, and ways to structure the courses toward the occupational clusters.

- The academic courses may be designed so that only students from one occupational cluster (career path) are enrolled, or they can be designed so that the courses include students from all occupational clusters (career paths).

- The occupational clusters or career paths encompass entry-level, middle-level, and professional-level occupations, thus integrating vocational, general-track, and college-bound students.

- Students must think early in their high school careers about their occupational futures. However, if students have a good reason, they can change career paths at the beginning of each semester with approval from a counselor.

Tech Prep

Tech Prep (technical preparation) is an educational movement that often embeds the integration of academic and vocational education into its curricula. Tech Prep is a combined secondary and postsecondary program that leads to an associate degree or two-year certificate. Additionally, Tech Prep programs provide technical preparation leading to employment.

Tech Prep programs surfaced in the mid-1980s to better prepare students for postsecondary education as well as for immediate employment. The Tech Prep concept evolved from an articulation movement during the 1960s and 1970s where students could take select classes during high school that would count toward graduation credit at the community college level (Stern, 1991). In a Tech Prep program, courses at the high school level are designed to be sequential with those at the community college level. Students begin an integrated academic and vocational education program of study as early as the ninth grade. Courses taken during the junior and senior year are prerequisites for an established program at the community college level. This progression enables high schools and community college systems to provide stronger programs with no overlap (Hemmings, 1991). Tech Prep education links vocational education programs with appropriate high school academic programs to better prepare graduates for higher education and employment in technical fields.

- Tech Prep programs are based on a labor market analysis of the region.
- High schools, community colleges, and local businesses collaborate in planning, implementing, providing, and evaluating Tech Prep programs.
- There are variations in the Tech Prep approach:
    - One approach is for students to begin a program of study in the eleventh grade and then continue at a community college for two years to earn an associate degree. This approach is known as a "2+2."
    - Another approach is for the program of study to begin in the ninth grade and is referred to as a "4+2."

- Another approach is to begin a program of study in the last two years of high school, continue for two years at a community college, then transfer to a four-year institution for two years, culminating in a bachelor's degree. This approach is known as a "2+2+2."

- Sequential programs of study are designed for the students.

- The coursework includes a variety of experiences.

  - Students enroll in academic classes and vocational classes.

  - Students use experiential learning environments and hands-on techniques (applied academics).

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What Are Some of the Possible Barriers to Integration?

This section discusses possible barriers to integrating academic and vocational education. These are identified as administrative, school, and teacher barriers. Possible solutions are listed after each specific barrier.

Administrative Barriers

Administrators may not provide time during the day or provide incentives for teachers to exchange ideas and work together.

- ***Provide open, unstructured time for academic and vocational teachers to share in a relaxed atmosphere.***
- ***Provide incentives for teachers to become involved and to implement innovative strategies for integrating academic and vocational education.***
- ***Move classroom locations, whenever possible, of both academic and vocational teachers so they will have more ready access to one another.***
- ***Provide academic and academic teachers who are working in teams with common planning periods.***

Support from administrators may not be evident. Yet at school sites where exemplary integration efforts are under way, strong support from administrators, including both principals and district administrators, is in place.

- ***Assure that all administrators display commitment to the concept of integration, not just vocational administrators.***
- ***Let teachers know of administrative support for the changes in instruction through informal as well as formal channels of communication.***

Implementation of the integration process may begin with insufficient planning, defeating the process before it is begun.

- ***Work with the business community to determine competencies needed by local employees.***
- ***Contact school districts that have already implemented the integration process.***
- ***Involve all teachers and counselors in the change process.***
- ***Have teachers assume as many leadership responsibilities as possible.***

- ***Publicize to the students, parents, and community the purposes and anticipated outcomes of the cooperative efforts being undertaken by the vocational and academic teachers.***

School Barriers

Graduation requirements in English, mathematics, and science have often increased, limiting the number of elective classes students can take.

- ***Enroll the students in English, mathematics, and science classes that are applicable to their programs of study (e.g., business English, consumer mathematics, and principles of technology).***
- ***Pair up an academic and a vocational teacher and have them team teach.***
- ***Infuse academic skills into vocational classes; similarly, infuse vocational skills into academic classes.***

Schools may not allow equivalent credit toward graduation for applied courses.

- ***Define the benefits to students, teachers, and taxpayers of granting equivalent credit.***
- ***Provide for content accountability—that what a school proposes will be taught in a course will actually be taught.***
- ***Take measures to assure that courses are not "watered" down.***
- ***Determine which curriculum areas are most conducive for allowing equivalent credit.***
- ***Form a curriculum committee comprised of school personnel and the business community to determine desired outcomes and to define course competencies.***
- ***Match learning objectives between academic and vocational courses to determine credit possibilities.***

- ***Build trust and communication among the teachers as well as with other school personnel.***

- ***Work with central office personnel to establish equivalent credit toward graduation for applied courses.***

- ***Publicize the equivalent credit options available to the students.***

- ***Monitor the equivalent credit process.***

- ***Work with postsecondary institutions to assure they will accept equivalent credit courses.***

- ***Develop a cross-crediting application process.***

Most school districts have limited resources available for staff development, teacher released time, and other expenditures needed when implementing academic and vocational integration.

- ***Apply for federal and/or state grants to fund teacher released time, staff development, and needed equipment and materials.***

- ***Work cooperatively with local postsecondary institutions to provide staff development activities at a reasonable cost.***

- ***Work with local businesses who may be willing to provide necessary equipment, staff development, and expertise.***

The traditional time structure (330-minute instructional day) imposed on schools may not allow the flexibility needed for integrating some classes.

- ***Change the mandatory time requirements from a 330-minute instructional day to a mandatory 27.5-hour week. This change will give schools more flexibility in scheduling classes during the week. For example, one day may consist of 360 minutes of instruction and another day may consist of 330 minutes of instruction.***

The traditionally separate academic and vocational structures may be hard to overcome.

- ***Eliminate the dichotomy of vocational versus academic by having teachers work together to focus on the needs of students rather than on content.***
- ***Provide for extensive staff development with clearly defined outcome goals that involves all academic and vocational teachers.***
- ***Move classroom locations, whenever possible, of both academic and vocational teachers so that they will have more ready access to one another.***
- ***Have an academic teacher serve on each of the vocational area advisory committees.***
- ***Encourage academic teachers to borrow books and curriculum guides from vocational teachers and vice versa.***
- ***Have academic and vocational teachers share equipment (e.g., video cameras and computers) on a regular basis.***

Teacher Barriers

Many teachers already feel inundated with the paperwork and time spent outside of the classroom. They may express a concern over the additional time required to integrate academic and vocational education.

- ***Provide open, unstructured time for academic and vocational teachers to share in a relaxed atmosphere.***
- ***Pair up academic and vocational teachers so they can work as a team, then schedule their planning period at the same time so they can work together either on a daily or weekly basis.***

Some teachers may perceive the integration of academic and vocational education as just another passing fad. Therefore, they may not want to "waste" their time getting involved.

- ***Have academic and vocational teachers visit sites that have already integrated academic and vocational education.***

- ***Pair up academic and vocational teachers, then have them spend time in a business together for a brief period (e.g., two weeks) during the summer months. This will enable the academic teacher to see how vocational skills are applied in the work setting. Similarly, the vocational teacher will be able to see how academic skills are applied in the work setting.***

- ***Provide funding (possibly through grants) as an incentive for academic and vocational teachers to work together.***

If the integration begins as a pilot project in just a couple of classes, some of the teachers may feel isolated and uninvolved.

- ***Assure that teachers feel they are part of the integration movement by involving them in the development of integration goals and objectives from the start.***

- ***Give the teachers as many leadership responsibilities as possible.***

Some teachers may feel threatened by change. They may feel that they are losing control or that they are being "pushed out."

- ***Provide staff development opportunities for both academic and vocational teachers.***

Some teachers may be hesitant to work with teachers in other disciplines.

- ***Find teachers who have already worked with integrating academic and vocational education. Let them serve as mentors for teachers in other disciplines.***

- ***Assign academic and vocational teachers to work in teams, then have team meetings at least once a month so they can share ideas, plan, assess, and evaluate progress of course instruction.***

Some teachers may have negative attitudes and always blame other people if something goes wrong.

- ***Pair up academic and vocational teachers so they can work cooperatively.***
- ***Establish a positive climate for the change process and involve all teachers in it.***
- ***Provide an atmosphere where teachers are allowed to experiment and make mistakes without fearing retribution.***

Some vocational teachers have a limited educational background with restricted certificates. Some individuals in administration and academia perceive this to be a lack of academic capability.

- ***Provide staff development opportunities for the vocational teachers so they can be certified to teach other classes (e.g., applied English and applied math).***
- ***Eliminate the dichotomy of academic versus vocational by having teachers work together to focus on the needs of the students, students both academic and vocational teachers have in their classes.***

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How Do Teachers Become Involved?

This section discusses possible ways of encouraging cooperative efforts between academic and vocational teachers. The section is organized into three areas: (1) cooperation initiatives, (2) time inducements, and (3) incentives.

To better prepare students for the workplace of the 1990s and the twenty-first century as well as for lifelong learning, schools are integrating academic and vocational education. A significant factor that determines the success or failure of the integration process is a commitment by both academic and vocational teachers to work together. In a guide for enhancing cooperation between academic and vocational teachers published by the Northwest Regional Education Laboratory, a number of reasons for teachers to work together to integrate academic and vocational education are discussed:

- Research shows that many vocational students have low achievement levels in basic skills. Academic and vocational teachers working together in a cooperative effort can help reinforce basic skill development.

- When academic and vocational teachers collaborate to integrate their instruction, they can help students understand underlying concepts behind the facts and processes that are taught in vocational courses.

- Similarly, many students in academic courses do not understand the relevance of the material presented to them. Therefore, academic and vocational teachers should work together to help students in academic courses see a connection between the material and the real-world applications.

- Businesses consistently cite the need for employees who have a cooperative attitude and who can work together. However, most school situations foster independence and competition rather than cooperation and teamwork. Academic and vocational teachers who cooperate and work together to integrate their courses can serve as role models for the students.

- By working together with colleagues across disciplines, academic and vocational teachers have the opportunity to learn new teaching techniques as well as new skills. This collaboration can be a motivational factor that increases job satisfaction.

Cooperation Initiatives

- Eliminate the dichotomy of academic versus vocational by having teachers work together to focus on the needs of students—students both academic and vocational teachers have in their classes.
- Assure that academic teachers feel they are part of the integration movement by involving them in the development of integration goals and objectives from the start.
- Have an academic teacher serve on each of the vocational education program's advisory committees.
- Have academic and vocational teachers share competency lists on a regular basis so they can learn the basic competencies others teach or require students to learn.
- Have teachers emphasize the same academic competencies and teach coordinated information about the competencies' use when academic and vocational teachers share students between their classes.
- Have academic teachers identify vocational competencies they would like the vocational teachers to emphasize. Likewise, have vocational teachers identify specific academic competencies they would like academic teachers to emphasize.
- Emphasize to vocational teachers the complexity of learning and applying basic academic skills—skills that cannot be taught in isolation by academic teachers alone.
- Have academic and vocational teachers share class rolls so they will know which of their students are in the others' classes.
- Have vocational teachers share students' work in vocational classes with academic teachers.
- Encourage academic teachers to borrow books from vocational teachers and vice versa.

- Have academic and vocational teachers share equipment (e.g., video cameras and computers) on a regular basis.

Time Inducements

- Provide time for academic teachers to observe ongoing instruction in vocational classes. Likewise, provide time for vocational teachers to observe ongoing instruction in academic classes.

- Provide extra time and incentives for academic and vocational teachers to work together when vocational teachers are located at vocational centers and have little regular contact with academic teachers.

- Pair up academic and vocational teachers so they can work as a team; schedule their planning periods at the same time so they can work together either on a daily or weekly basis.

- Organize academic and vocational teachers into teams, then have team meetings at least once a month so teachers can share ideas and plans and evaluate instructional progress. Be sure the teams are small enough, three to eight members, to ensure interaction.

- Pair up academic and vocational teachers; then, have them spend time in a business together for a brief period (e.g., two weeks) during the summer months. This will enable the academic teacher to see how vocational skills are applied in the work setting. Similarly, the vocational teacher will be able to see how academic skills are applied in the work setting.

Incentives

- Administrators should attend team meetings so they are aware of the work teachers are accomplishing together. This collaboration should also motivate the teachers because they will feel that what they are doing matters.

- Have a recognition luncheon or dinner each semester to reward the academic and vocational teachers in each team for their team efforts and accomplishments.
- Have an assembly once a year where academic and vocational teachers can be recognized for their efforts in the integration process.
- Invite advisory committee members to the school to recognize academic and vocational teachers for their integration efforts.
- Publicize the integration efforts of the academic and vocational teachers in local newspapers and on television. Each month feature different work teams and methods being used.
- Give academic and vocational teachers who are involved in the integration efforts framed letters of commendation from the principal and superintendent. Copies of the letters should be placed in the teachers' personnel files.
- Give plaques to the academic and vocational teachers who are working together to integrate their classes.
- Provide funding (possibly through grants) as an incentive for academic and vocational teachers to work together. During the funding period, the teachers should periodically provide information on their progress.
- Enlist the help of the business community in providing input for curriculum development and monitoring the progress of the program.
- Give academic and vocational teachers recertification points for completion of one or two years of cooperative efforts.
- Provide staff development opportunities in integration for academic and vocational teachers. However, the staff development programs should ensure that the teachers receive something they can use to enhance their collaborative efforts.
- Find teachers in the school who have already worked with integrating academic and vocational education. Let them serve as mentors for other teachers.

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What Are the Roles of Key Players in the Integration Process?

This section discusses the roles of key players in the integration process. The key players are academic and vocational teachers, secondary school principals, secondary school counselors, and secondary school administrators and supervisory personnel. During the integration process, teachers may take on the roles of leaders, team members, learners, and instructors. Secondary school principals take on the roles of supporter, communicator, motivator, delegator, and manager. Secondary school counselors assume the roles of team member, evaluator, and leader; and secondary school administrators and supervisory personnel assume the roles of supporter, communicator, motivator, delegator, and manager.

The Role of Academic and Vocational Teachers

Leader

- Academic and vocational teachers may be called upon to serve as chairs and/or members of committees (e.g., planning, assessment, grant application, materials development, staff development, evaluation, and promotion).
- Academic teachers may be asked to serve as advisory committee members for vocational areas.
- Academic and vocational teachers experienced in the integration process can serve as mentors to other teachers.

Team Member

- Academic and vocational teachers will need to work together in cooperative efforts for the integration process to be successful.
- Both academic and vocational teachers must be willing to accept new ideas and to work in interdisciplinary teams.
- Both academic and vocational teachers should be willing to share materials, books, and equipment with other teachers. If there are operating or safety instructions that must be followed, the teacher lending the equipment should assist the teacher borrowing it (or provide instruction materials).
- Academic and vocational teachers should plan to get together at least once a week during their planning periods to develop and share ideas on integrating their classes.
- Academic and vocational teachers will need to set aside some after-school hours to work as members of a team on the integration process.

Learner

- Both academic and vocational teachers may need to participate in staff development activities to improve or gain new skills (i.e., academic teachers may

need instruction in vocational skills and vocational teachers may need a review of academic skills).

- Both academic and vocational teachers should be called upon to share their expertise and lead a staff development session for the other teachers.

- Academic teachers should observe ongoing instruction in vocational classes. Likewise, vocational teachers should observe ongoing instruction in academic classes.

Instructor

- Academic teachers may be asked to teach a particular lesson in a vocational class. Similarly, vocational teachers may be asked to teach a lesson in an academic class.

- Academic and vocational teachers may be called upon to team teach.

- Academic and vocational teachers will need to develop and/or adapt curriculum materials.

- Academic teachers will need to share their course competency requirements with vocational teachers. Similarly, vocational teachers will need to share their course competency requirements with academic teachers.

The Role of Secondary School Principals

Supporter

- Assure that all administrators display commitment to the concept of integration, not just vocational administrators.

- Let teachers know of administrative support for the changes in instruction through informal as well as formal channels of communication.

- Model the commitment through actions.

- Assure that guidance counselors are involved in all stages of the change process and that they support the concept of integrating academic and vocational education.

- Provide extensive staff development with clearly defined outcome goals that involves all academic and vocational teachers.

- Once the teachers are working in teams and holding regular meetings, attend the team meetings at least once a month.

- Provide the academic and vocational teachers with necessary resources (i.e., clerical help, supplies, and materials).

- Help the academic and vocational teachers find information they need to solve a problem. This may involve finding knowledgeable individuals.

Communicator

- Provide teachers, school personnel, central office personnel, students, parents/guardians, and public groups accurate information reflecting measurable outcomes of the integration effort.

- Publicize to the students, parents/guardians, and community the purposes and anticipated outcomes of the cooperative efforts being undertaken by the academic and vocational teachers.

- Survey teachers and students to gain insight as to their perception and acceptance of the changes being implemented.

- Have both academic and vocational teachers take time to ask students what they think they are learning.

Motivator

- Establish a positive climate for the change process and involve all teachers in it.

- Provide a staff development environment that is free from distractions of the day-to-day routine of school operation.

- Divide teachers into small work groups when asking them to cooperate on various aspects of academic and vocational integration.

- Provide open, unstructured time for academic and vocational teachers to share in a relaxed atmosphere.

- Provide incentives for teachers to become involved and for implementing innovative strategies for integrating academic and vocational education.

- Update teacher evaluation procedures to reflect both changes in teaching that occur as a result of the integration movement and increased emphasis on applied learning.

Delegator

- Help teachers develop a feeling of ownership in the changes that are taking place by having them assume as many leadership responsibilities as possible.

- When vocational offerings are provided at a vocational center, designate a teacher at the center and one at each feeder school to serve as site coordinators for achieving the integration outcomes.

- Designate responsible students as carriers of information between feeder schools and the vocational center to eliminate the delay of going through the central office.

Manager

- Monitor professional development activities contracted to outside sources to assure they are meeting the needs of both academic and vocational teachers.

- Monitor planning and instruction of both academic and vocational teachers to assure that changes agreed upon to achieve the goals of integration are actually occurring.

- Review overall plans and strategies for achieving the integration of academic and vocational education with the teachers on a regular basis, at least twice a year.

- When hiring new personnel, hire individuals who are supportive of the integration movement.
- Whenever possible, move classroom locations of both academic and vocational teachers so they will have more ready access to one another.
- Encourage the use of uniform attendance and tardiness rules at both feeder schools and vocational centers.
- Work with the business community to find sites where academic and vocational teachers can work for a brief period during the summer.
- Work with the state and district central office to grant equivalent credit towards graduation for applied courses (e.g., applied mathematics and business English).
- Submit applications for grants to help fund the integration process.
- Visit schools that have already implemented the integration of academic and vocational education. Look at successful strategies as well as those strategies that have failed. Begin to develop an integration strategy for your school.
- Devise a system for loaning material and equipment among teachers.
- Allow a margin for mistakes. As with any new process, mistakes will occur and modifications will need to be made.

The Role of Secondary School Counselors

Team Member

- Counselors should collaborate with educational personnel in advocating the integration of academic and vocational education.
- Counselors can work with academic and vocational teachers to help establish sequential course offerings.
- Once the teachers are working in teams and holding regular meetings, counselors should attend the team meetings at least once a month.

Evaluator

- Counselors should work with students individually to help each student develop a sequential program of study.
- Counselors should administer tests to help determine students' interests and abilities.
- Counselors should work with students individually to help them determine their particular interests and career goals.
- Counselors may work with alumni to help determine deficiencies in academic and vocational skills.
- Counselors may be responsible for maintaining records that will help assess the outcomes of integrating academic and vocational education.
- Counselors should be familiar with the program areas and the career paths available to the students who complete the programs.

Leader

- Counselors should be willing to serve as chairs and/or members of committees (e.g., planning, assessment, grant application, materials development, staff development, evaluation, and promotion).
- Counselors should develop an understanding of the academic and vocational competencies needed in the workplace.
- Counselors can form positive relations with the business community.

The Role of Secondary School Administrators and Supervisory Personnel

The roles of secondary school principals and secondary school administrators and supervisory personnel may overlap. Further, all principals may not fully embrace the integration movement, in which case the central administration may assume many of the principals' responsibilities to ensure a smooth and successful transition.

Supporter

- Assure that all administrators display commitment to the concept of integration, not just vocational administrators.
- Let teachers know of administrative support for the changes in instruction through informal as well as formal channels of communication.
- Model the commitment through actions.
- Assure that guidance counselors are involved in all stages of the change process and support the concept of integrating academic and vocational education.
- Provide for extensive staff development with clearly defined outcome goals that involves all academic and vocational teachers.
- Once the teachers are working in teams and holding regular meetings, attend the team meetings at least once a month.
- Provide the academic and vocational teachers the necessary resources (e.g., clerical help, supplies, and materials) for achieving the integration.
- Help the academic and vocational teachers find information they need to solve problems. This assistance may involve finding individuals knowledgeable about integrating academic and vocational education.

Communicator

- Provide school administrators, teachers, school personnel, students, parents/guardians, and public groups accurate information reflecting measurable outcomes of the integration effort.
- Publicize to school personnel, students, parents/guardians, and community the purposes and anticipated outcomes of the cooperative efforts being undertaken by the academic and vocational teachers.

- Survey school administrators, teachers, and students to gain insight into their perceptions and acceptance of the changes being implemented.

- Take time to ask students what they think they are learning.

Motivator

- Establish a positive climate for the change process and involve all school administrators, counselors, and teachers in it.

- Provide a staff development environment that is free from distractions of the day-to-day routine of school operation.

- Divide teachers into small work groups, three to eight individuals, when asking them to cooperate on various aspects of academic and vocational integration.

- Provide open, unstructured time for academic and vocational teachers to share in a relaxed atmosphere.

- Provide incentives for school principals and counselors to become involved in the integration movement.

- Provide incentives for involving teachers and for implementing innovative strategies to integrate academic and vocational education.

- Update school principal and counselor evaluation procedures to reflect changes that occur as a result of the integration movement and increased emphasis on applied learning.

- Update teacher evaluation procedures to reflect both changes in teaching that occur as a result of the integration movement and increased emphasis on applied learning.

Delegator

- Help other administrators and counselors develop a feeling of ownership in the changes that are taking place.

- Help teachers develop a feeling of ownership in the changes that are taking place by having them assume as many leadership responsibilities as possible.

- When vocational offerings are provided at a vocational center, designate a teacher or administrator at the center and one at each feeder school to serve as site coordinators for achieving the integration outcomes.

- Designate responsible students as carriers of information between feeder schools and the vocational center to eliminate the delay of going through the central office.

Manager

- Monitor professional development activities contracted to outside sources to assure they are meeting the needs of both academic and vocational teachers.

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- When hiring new personnel, hire individuals who are supportive of the integration movement.

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- Work with the business community to find sites where academic and vocational teachers can work for a brief period during the summer.

- Work with state and school personnel to grant equivalent credit towards graduation for applied courses (e.g., applied mathematics and business English).

- Submit applications for grants to help fund the integration process.
- Visit schools that have already implemented the integration of academic and vocational education. Look at successful strategies as well as those strategies that have failed. Begin to develop an integration strategy for your school.
- Devise a system for loaning material and equipment among teachers.
- Allow a margin for mistakes. As with any new process, mistakes will occur and modifications will need to be made.

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What Is the Process for Implementing the Integration?

In this section, the process for implementing the integration of academic and vocational education is discussed. Three aspects of the process are presented: (1) the planning stages, (2) the marketing strategy, and (3) strategies for policy changes.

Implementation

The Planning Process

Planning is critical to the success of integrating academic and vocational education; therefore, comprehensive planning should take place prior to the implementation of the integration process. Those involved in the planning process need to be systematic and leave "no stone unturned." Further, the planning team should consider the course structure of the entire school and/or feeder schools. This process will eliminate duplication of efforts as well as contradictory plans of action.

- Meet with school personnel and form a committee of those individuals who are interested in integrating academic and vocational education.

  Those recommended to serve on the committee are principal, vocational director, counselor, academic teacher, vocational teacher, a parent/ guardian, a student, and an individual from the business community. This diverse composition is suggested so the committee members can communicate with other individuals who will eventually be involved in the integration process.

- State the problem and list alternative solutions.

  Examine the existing situation and the reasons it is not meeting current and future needs.

  Alternative solutions can be identified by looking at various integration models as well as by visiting schools that have already integrated academic and vocational education.

- Form an integration strategy for your school.

  Examine the existing integration models and determine if any will meet your school/district needs. Keep in mind the positive characteristics as well as the negative characteristics of existing integration models. You may decide not to choose any one model but decide to take features from several existing models and develop your own integration strategy.

- Determine if the school structure needs to be changed.

  Some integration models require that the school structure change. For example, you may decide to restructure your school around occupational clusters rather than into the traditionally separate academic and vocational sequences.

- Determine what additional resources and funding will be needed and where they will be obtained.

  When integrating academic and vocational education, some models require additional personnel, material development, planning times, and so on. Therefore, determine what additional resources will be needed and how long it will take to obtain (or develop) them.

- Decide what role each staff member will initially have in integration.

  When integrating academic and vocational education, many jobs need to be accomplished; therefore, all personnel can and should be involved from the beginning. Each person's role should not be determined in isolation. Rather, the committee should determine roles after soliciting input from all school personnel. This process conveys from the very beginning that both academic and vocational teachers will be involved and establishes an atmosphere of open communication.

- Determine whether extensive staff development is required.

  Take an inventory of your staff's backgrounds, strengths, and weaknesses. If it is determined that extensive staff development is needed, you will need to decide whether it will be provided in-house or it will be provided by an external source (e.g., a postsecondary institution).

- Determine the time frame for implementing the integration process in the school.

  The most feasible time for the implementation of the integration process is at the beginning of the school year. All courses may be integrated from the outset, or your school may choose to phase in the integration process over time.

- Implement the integration of academic and vocational education into the academic and vocational courses.

  By the time academic and vocational education are integrated into the courses, all individuals within the school and local community should be informed of the integration movement and the anticipated outcomes; however, the lines of communication should remain open at all times.

- Assess and evaluate the integration of academic and vocational education.

  The implementation process should be monitored continuously. Assess the students' gains in achievement against anticipated gains. Document incidences of student achievement that have resulted from the integration. Determine whether the efforts have been successful and whether modification is needed.

The Marketing Strategy

For the integration of academic and vocational education to be successful, individuals need to change. Thus, a new vision with new information, benefits, approaches, and values must be marketed. Additionally, marketing the integration of academic and vocational education should be an ongoing, multiphased, and multifaceted process.

- Form a promotion committee to develop a marketing strategy.

  Committee members should include counselors; faculty from the school's marketing department; and representatives from business and industry,

local news media, and local organizations. This composition will help to ensure a broad base of support for your integration initiative.

- Inform and seek support from the business community, parents/guardians, and students as well as your own administration and staff.

  Segment your market into meaningful groups (e.g., the business community, parents/guardians, students, and school administration and staff). Refer to Figure 2 for suggested market audiences. Defining your market audience allows you to build constituencies who understand the concept of integrating academic and vocational education and can further promote your integration strategies.

- Once a marketing strategy and the market segments are determined, channels of communication must be opened.

  Some suggested options are as follows:

  - ***bulletin boards***
  - ***informational brochures***
  - ***billboards***
  - ***letters to parents/guardians***
  - ***informational meetings***
  - ***flyers***
  - ***newspaper releases***
  - ***radio & television releases***
  - ***information booths***

POTENTIAL TARGET AUDIENCE

Figure 2

Strategies for Policy Changes

Many individuals who espouse educational reform believe that the amount of money funneled into a program and program effectiveness are positively correlated. As reported by McLaughlin in the *Educational Researcher* in 1990, RAND Corporation found that policymakers formulating federal legislation in the 1960s and 1970s assumed a direct correlation between the amount of money available for a project and its eventual success. However, even though money is essential to local efforts, it does not always guarantee program success. Rather, RAND found that project scope and administrative support have greater influence on successful program implementation and long-term adoption.

For studies conducted by RAND, the researchers found that school districts usually adopted policies consistent with federal legislation. However, unless variables in addition to the amount of money available were present, the changes implemented did not guarantee effective reform or long-term adoption of the policy. The following strategies for effective, long-term policy change are derived from RAND's analysis of policy change.

- Do not focus on special projects which tend to bear on single issues.

  Special projects tend to be narrow in scope and focus on short-term solutions. This is inconsistent with the multiple pressures faced by educators. Additionally, educational reform cannot be a "quick fix." Rather, reform must be systematic and progressive.

- Both curriculum content and teaching strategies need to be changed.

  Many of the early education reforms failed because they attempted to initiate new decision-making strategies, classroom management techniques, or staff development but neglected to update curriculum content. Therefore, when integrating academic and vocational education, it is essential that the curriculum be evaluated and, if necessary, modified.

- Look beyond formal policy structure as an avenue to promote improvement and stimulate change.

  One suggestion is to look to professional organizations and networks that engage teachers and administrators. These organizations and networks can support change in a sustained fashion.

  Because teachers and administrators are responsible for the eventual success or failure of the integration movement, they must realize the systematic nature of the change process.

- If an outside consultant is used, be sure the consultant is responsive to local conditions and needs.

  Outside consultants may be knowledgeable about planning and implementation procedures for integrating academic and vocational education; however, for the implementation to be successful, local needs, strengths, and weaknesses must be taken into consideration.

- Individual teachers must change attitudes and teaching strategies before a school or school district can successfully implement the integration of academic and vocational education.

  Individuals responsible for initiating policy change in a school district need to be aware of the general concerns teachers and other school personnel may experience. First, they will experience concerns about how the change will affect them personally. Then, once those concerns are resolved, people will begin to focus on more task-oriented concerns. Finally, impact-oriented concerns will emerge. At this level, individuals will begin to look at the level of student learning (i.e., whether students are learning more after the integration implementation than they previously did) and ways to collaborate with other teachers to improve the relevance of their instruction even more.

- Policy mandates should be communicated in positive terms rather than in negative terms.

  When communicating the desired outcomes of integrating academic and vocational education, express the policy mandates as opportunities rather than as barriers or constraints.

- Effective change should occur simultaneously from the top down and from the bottom up.

  For the integration of academic and vocational education to be successful, administrators must demonstrate support for the movement. At the same time, both academic and vocational teachers, who will actually implement the integration process, must also exhibit support for the movement.

- Inform individuals that change is a process and does not occur overnight.

  When implementing change, some individuals want to see immediate results. However, integrating academic and vocational education will require a significant amount of time and effort during the preliminary planning and implementation stages. Unless this is explained at the very beginning, the integration movement may be doomed before it is ever begun.

- Policy change usually occurs in three phases: (1) the initiation phase, (2) the implementation phase, and (3) the institutionalization phase.

  During the initiation phase, individual self-concerns need to be addressed.

  - ***Help people visualize the changes that will occur with the integration of academic and vocational education.***

- *Send people (e.g., academic teachers, vocational teachers, counselors, and principals) to schools that have already integrated academic and vocational education.*

- *Bring in teachers who have successfully worked with the integration process to give testimonials.*

- *Tell teachers they will be supported in integrating academic and vocational education (if the above suggestions are followed, you will not only be telling them but also showing them).*

- *Involve teachers in the planning stage as much as possible.*

- *Be sure teachers are involved in curriculum development and instructional strategies to be incorporated into their classes.*

- *Be very clear about expectations (e.g., time line and evaluation).*

- *Do not spend too much time in the initiation phase. Not only do you run the risk of spending too much money at this phase, but you also run the risk of people losing interest.*

- *Save money for the implementation phase as well as for follow-up.*

During the implementation phase, task-oriented concerns (e.g., How do I do it?) should be addressed.

- *Provide a series of staff development workshops for the people who will be directly involved in integrating academic and vocational education.*

- *Have someone available who can come into the classroom to provide assistance and to answer questions as they arise.*

- *Have someone available to provide emotional support for those working directly with integrating academic and vocational education.*

- ***Provide the teachers with tools that help them monitor student learning. If the teachers realize that student learning has improved, skepticism and resistance to integrating academic and vocational education can be reduced.***

Do not neglect the institutionalization phase, the phase where the integration of academic and vocational education either does or does not become a fundamental characteristic of the school.

- ***Be sure that academic and vocational teachers become team players and incorporate the integration process into their "normal" class routine.***

- ***For integration to take a foothold in the school, there should be a broad support base. If just one individual supports the integration movement and he/she leaves the area or goes onto another job, no support is left. Therefore, leadership may best be provided by a team.***

- ***Support mechanisms (e.g., budget, curriculum, and guidelines) for integrating academic and vocational education should be incorporated into the ongoing organizational structure of the school and/or school district.***

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"What Works"

This section is derived from Schmidt's (in press) manuscript *Establishing a Climate for Faculty Cooperation in the Integration of Vocational and Academic Education.* In this section are listed effective curricular and instructional strategies.

Effective Curricular Strategies

Programs of Study

- Realign the curriculum to eliminate the general track and develop plans of study for all students accordingly.
- Have students adopt one of three plans of study—vocational, academic, or combined—as soon as possible.
- Remind teachers that in the past the policy of "no plan of study" for most students locked them into "no future."
- Have academic and vocational teachers work together to develop plans of study for all vocational offerings—plans that prepare students for continued study in a postsecondary technical program or at a four-year institution.

Instruction Based on Assessment

- Learn from employers the workplace skills needed on the job and then have academic and vocational teachers work together to stress them in their instruction.
- Survey area employers to determine the use of technology and academic skills in various work settings; then use the survey findings as a basis for changes in instruction in both academic and vocational offerings.

Communication

- Inform students of curricular changes and the reasons for them. Students perceive teachers more positively when they learn that academic and vocational teachers are working together.
- Emphasize the importance of academic and vocational teachers relating their instruction to applied uses. This focus on application helps eliminate the problem of students telling employers they have not learned even the most basic skills when they become employed.

Instructional Climate

- Make remedial instruction readily available to students who need it, particularly to help them meet academic skill requirements of vocational offerings.
- Encourage academic teachers to emphasize in their classes the value of combining vocational with academic preparation.
- Restructure general courses so that they become applied courses—courses where teachers emphasize real world skills and where students can see the reason for learning. Have academic and vocational teachers work together to develop instructional examples for applied offerings.
- Help academic teachers learn to rely less on text-based instruction and to rely more on vocational teachers as a resource for teaching real-life applications.
- Update library holdings so that they support a revised, applied curriculum.

Effective Instructional Strategies

- Have all teachers include basic academic skills objectives and instructional activities in their lesson plans.
- Encourage teachers to have higher expectations for students in all classes, particularly in their use of basic academic skills.
- Assign meaningful homework on a regular basis in all classes, including vocational classes. Further, establish expectations that homework be completed.
- Develop coordinated instruction between academic and vocational teachers—instruction that reinforces what the others are teaching.
- Have vocational teachers serve as guest speakers in academic classes to reinforce the need for what academic teachers are teaching.
- Use vocational student organization projects as a springboard for having academic and vocational teachers work together.

- Have academic and vocational teachers agree to reinforce the same basic academic skills during a particular period of time—for example, a grading period or several weeks.
- Have academic and vocational teachers develop cooperative assignments.
- Have academic teachers borrow equipment and supplies from vocational laboratories to illustrate actual math and science applications in their classes.
- Have vocational teachers incorporate academic skills in their day-to-day instruction, not try to teach them through drill and practice procedures.
- Have academic teachers prepare bulletin boards that illustrate vocational applications of skills taught in their classes.
- Keep on display in vocational classrooms lists of academic skills that the academic and vocational teachers have agreed to emphasize.
- Have students in all classes, including vocational classes, provide both oral and written responses in complete sentences.
- Encourage academic and vocational teachers to compare what they are teaching with respect to basic academic competencies to assure that they are teaching the same competencies.
- Pretest students on basic academic skills needed to succeed in vocational offerings, then offer remedial instruction only as needed.
- Help vocational teachers through appropriate professional development activities to gain the expertise they need to incorporate the teaching of basic academic skills into their instruction.
- Provide professional development activities for achieving integration that focus on needs of vocational as well as academic teachers when both types of teachers participate in the same inservice session.
- Establish procedures for academic teachers to follow to assure safety when using or borrowing equipment from vocational teachers.

- Provide academic teachers with adequate equipment, tools, and supplies to teach real-life applications.

- Assign academic and vocational teachers to plan together in small groups, preferably in pairs, to facilitate exchange of information and to develop coordinated instruction.

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Appendix A

Transparency Masters

These transparency masters have been prepared for use during staff inservice and during informational meetings with school administrators.

GOAL 1:

To provide all students with the occupational, academic, and higher-order thinking skills needed to function effectively in

- **A technologically advanced society**
- **A globally competitive marketplace**
- **An information-based economy**

GOAL 2:

To enhance students' learning using the findings of cognitive psychologists . . .

- **The focus is on students, not on content**
- **Basic academic skills and problem-solving skills are taught at the same time so that they are mutually reinforcing**
- **Students are encouraged to recognize and solve problems**
- **Academic skills are reinforced with hands-on applications**

HISTORY

The history of integrating academic and vocational education has been based around two questions:

1. **Why change the current instructional delivery system?**

2. **What skills do students need?**

JUSTIFICATION

- *A Nation at Risk* (1983)

- *The Unfinished Agenda* (1984)

- Outcry from business and industry leaders to upgrade the quality of education

- The Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990

SOME ARGUMENTS FOR INTEGRATING ACADEMIC AND VOCATIONAL EDUCATION

- **Economic necessity**

- **Findings from the field of cognitive science**

- **Social justice with respect to the distribution of academic and vocational learning**

I HEAR AND I FORGET.

I SEE AND I REMEMBER.

I DO AND I UNDERSTAND.

Old Chinese Proverb

CONTRADICTION IN SKILLS OBTAINED AND SKILLS NEEDED

- School emphasis on individual activities versus employer emphasis on group effort
- School emphasis on activities without the aid of tools versus employer emphasis on activities with the use of tools
- School emphasis on symbol-based learning versus employer emphasis on real-world problems
- School emphasis on general, widely usable skills and theoretical principles versus employer emphasis on specific, real-life situations

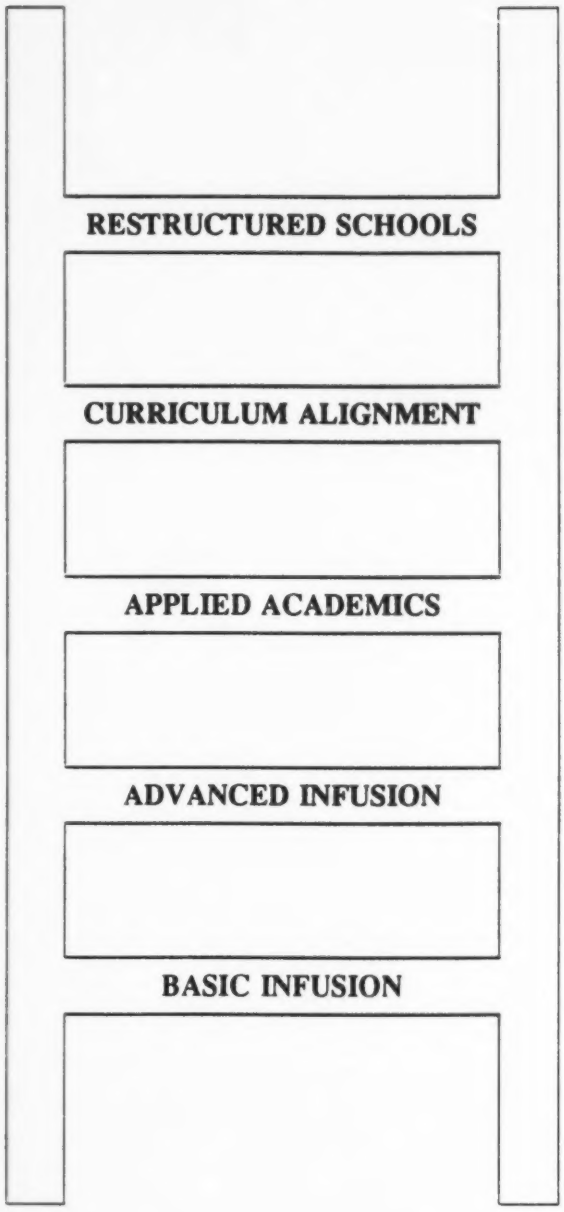
DEFINITION OF BASIC SKILLS

- **Reading, writing, & 'rithmetic**

PLUS

- **Thinking, problem solving, and comprehension**

THE INTEGRATION "LADDER"



HOW IS INTEGRATION STRUCTURED?

1. **The Infusion Model**

   - **May be formal or informal**
   - **Often used for remediation**
   - **Curricular approach**
   - **Considerable variation**
   - **Often viewed as "integration"**
   - **First step on the integration ladder**

HOW IS INTEGRATION STRUCTURED?

2. **The "Advanced" Infusion Model**

   - **Initiated by academic departments**
   - **Uses human resources**
   - **"Beef up" of vocational curriculum**
   - **Several options for implementation**
   - **Second step on the integration ladder**

HOW IS INTEGRATION STRUCTURED?

3. The Applied Academic Model

- Most common approach
- May be formal or informal
- Involves primarily academic teachers
- Applied academic courses
- Utilization varies widely
- Third step on the integration ladder

HOW IS INTEGRATION STRUCTURED?

4. **The Curriculum Alignment Model**

   - **Emphasis on teacher collaboration**
   - **Several options for implementation**
   - **Coordinated scheduling**
   - **Co- or cross-teaching**
   - **Project orientation**
   - **Fourth step on the integration ladder**

HOW IS INTEGRATION STRUCTURED?

5. The Academy Model

6. The Occupational Cluster Model

7. The Single-Occupation High School Model

8. The Career Path/Major Model

MODEL I*

Incorporating Academic Content into Vocational Courses

- **Vocational teachers are responsible for integrating academic skills into vocational courses.**
- **Collaboration between teachers is not a requirement.**
- **Integrated academic skills generally are remedial.**
- **This approach has not been proven effective.**

* Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

MODEL II*

Linking Academic and Vocational Teachers To Enhance Academic Competencies in Vocational Courses

- **Academic skills are integrated into vocational courses.**
- **Academic teachers are assigned to work with vocational teachers.**
- **Academic teachers have the prime responsibility for integrating academic skills into vocational classes.**
- **Academic and vocational teachers work cooperatively to modify vocational programs.**

* **Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.**

MODEL III*

Making the Academic Curriculum Vocationally Relevant

- **Vocational skills and concepts are integrated into academic classes.**
- **Academic teachers are responsible for integrating vocational concepts into their classes.**
- **Collaboration between academic and vocational teachers is not a requisite.**
- **Applied academic courses are common vehicles for integrating academic and vocational education.**

* Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

MODEL IV*

Curricular Alignment, Modifying Both Academic and Vocational Courses

- **Integration is considered at the program level rather than at the individual course level.**
- **Both academic and vocational classes are modified and coordinated to integrate academic and vocational skills.**
- **Collaboration among teachers is a requisite.**
- **Academic and vocational classes can be offered laterally or sequentially so that they reinforce each other.**
- **Curricula are developed locally.**

* **Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.**

MODEL V*

The Senior Project as a Form of Integration

- **Course content in all secondary classes centers around the senior project.**
- **Integration that occurs is unintentional.**
- **Collaboration between academic and vocational teachers is not requisite.**

* Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

MODEL VI*
The Academy Model

- **An academy operates as a school-within-a-school.**
- **The curriculum centers around a vocational program.**
- **Students take classes from the same teachers for the duration of their program.**
- **Horizontal and vertical alignment is promoted.**
- **Special needs students who have the potential to drop out may benefit from this type of integration.**

* Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

MODEL VII*

Occupational High Schools and Magnet Schools

- **High schools or magnet schools focus on a single occupational area.**
- **An occupational area is the basis for the curriculum content.**
- **The school's mission is to prepare students for future entry into a particular occupational area.**

* Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

MODEL VIII*

Occupational Clusters, Career Paths, and Occupational Majors

- **The curriculum is organized into**
  - **occupational clusters or**
  - **occupational clusters cut across conventional academic and vocational departments.**
- **Integration occurs at both the program and course levels.**
- **Collaboration between academic and vocational teachers is a requisite.**
- **Close alliances with the business community are important.**
- **Students formulate individual programs of study.**

* **Adapted from Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). "The cunning hand, the cultured mind": Models for integrating vocational and academic education (MDS-141). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.**

TECH PREP

- **A Tech Prep education program is a combined secondary and postsecondary program that leads to an associate degree or two-year certificate.**

- **Tech Prep programs are based on a common core of applied academics courses in math, science, and communications.**

- **Tech Prep programs provide technical preparation leading to employment.**

Integrating Academic and Vocational Education: Guidelines for Secondary School Principals

BARRIERS

- **Administrative Barriers**

- **School Barriers**

- **Teacher Barriers**

TEACHER INVOLVEMENT

- **Cooperation**

- **Time**

- **Incentives**

KEY PLAYERS

- **Academic and Vocational Teachers**
- **Secondary School Principals**
- **Secondary School Counselors**
- **Secondary School Administrators and Supervisory Personnel**

INTEGRATION PROCESS

- **Planning**
- **Marketing**
- **Policy Changes**

START TO FINISH.

WORK TO LEARN.

LIVE TO ENJOY.

B. June Schmidt

POTENTIAL TARGET AUDIENCE

Integrating Academic and Vocational Education:
Guidelines for Secondary School Principals